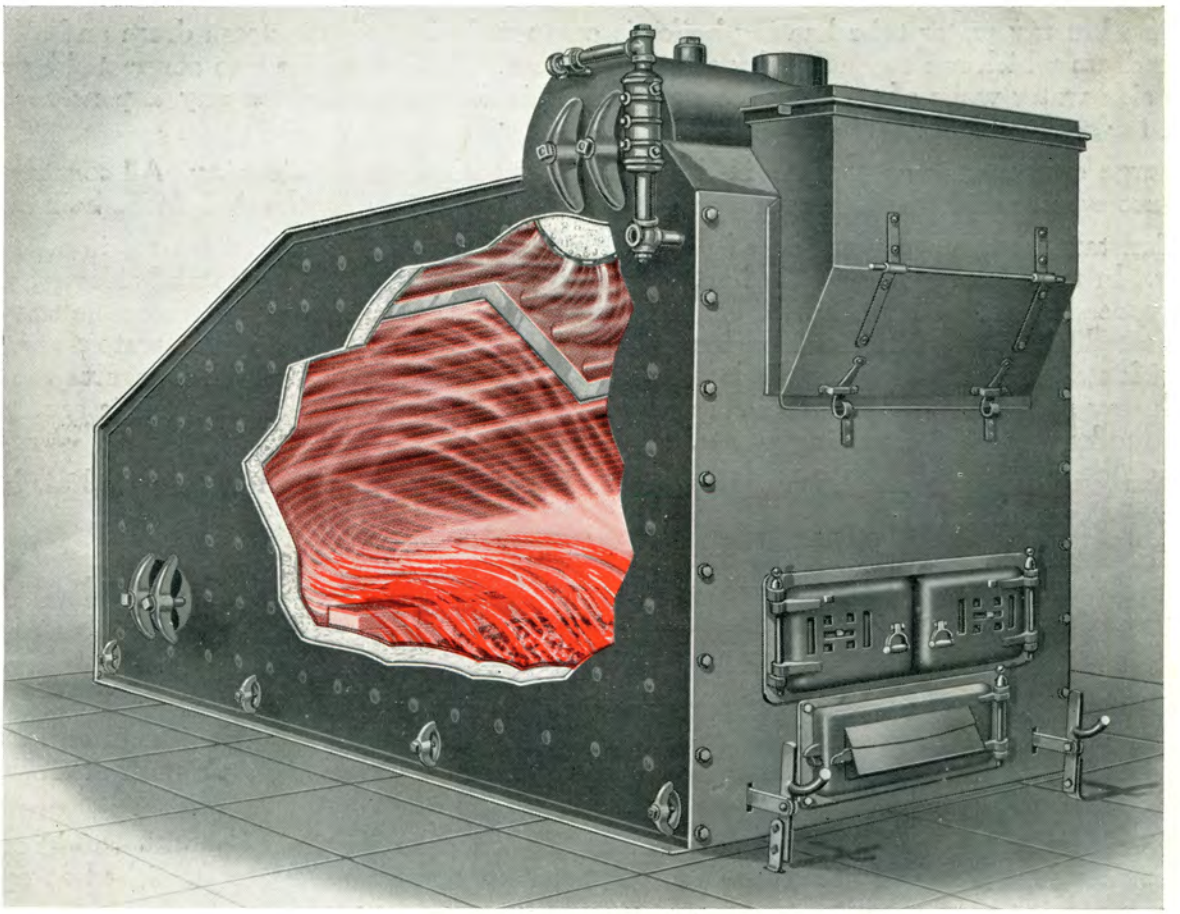
MURRAY

WATER TUBE HEATING BOILERS



MURRAY IRON WORKS COMPANY

INCORPORATED 1870

BURLINGTON, IOWA, U. S. A.

Bulletin No. B-102

A More Economical Heating Boiler

The demand for economy through more efficient steam generation has brought about new and improved designs of steam boilers. Power boiler users have adopted the water tube type of boilers due to the greater efficiency obtainable in this type and the consequent savings in fuel.

With this in mind, Murray has developed this highly efficient water tube heating boiler to give to users of low pressure steam or water boilers the same advantages of high efficiency that are secured in the most modern and up-to-date boiler plants.

This water tube heating boiler represents a great advance over any previous design. It introduces an entirely new principle which eliminates many serious deficiencies inherent in former designs of heating boilers.

The Murray water tube heating boiler is composed of an upper steam drum and a lower water drum which are connected by a bank of tubes. The drums are also connected by complete side water walls of the stay bolted type. This feature eliminates any expensive brick work for setting walls.

Large oval manholes are provided for access to each drum for cleaning. All construction is in accordance with the latest rules and regulations prescribed by the A. S. M. E. boiler code.

Constant and free circulation of water is one of the most important factors in a heating boiler. In the Murray water tube heating boiler the lower bank of tubes and side walls, being exposed directly to the heat of combustion and the baffles installed to direct the travel of the heated gases through the tube bank, set up a rapid circulation of the water, resulting in quick steam generation with the lowest possible expenditure of fuel. This assures the user of Murray water tube heating boilers the same high percent of efficiency that is secured in large modern power generating plants.

The fire being surrounded by water walls, losses due to radiation of heat and air leaks, are entirely eliminated.

The large water volume of the drums, tubes and side water walls, provides a tremendous heat storage or reservoir to be drawn upon to meet sudden demands or peak loads, thus assuring uniformity in pressure and in steam output.

Large furnace volume is provided to insure the most complete and efficient combustion of the fuel. Any type of firing equipment can be adapted to Murray water tube heating boilers.

The illustration on page three shows how the boilers can be arranged with either horizontal or vertical baffles. With either of these arrangements gases may be taken off at either the front or rear end of the boiler to suit local conditions.

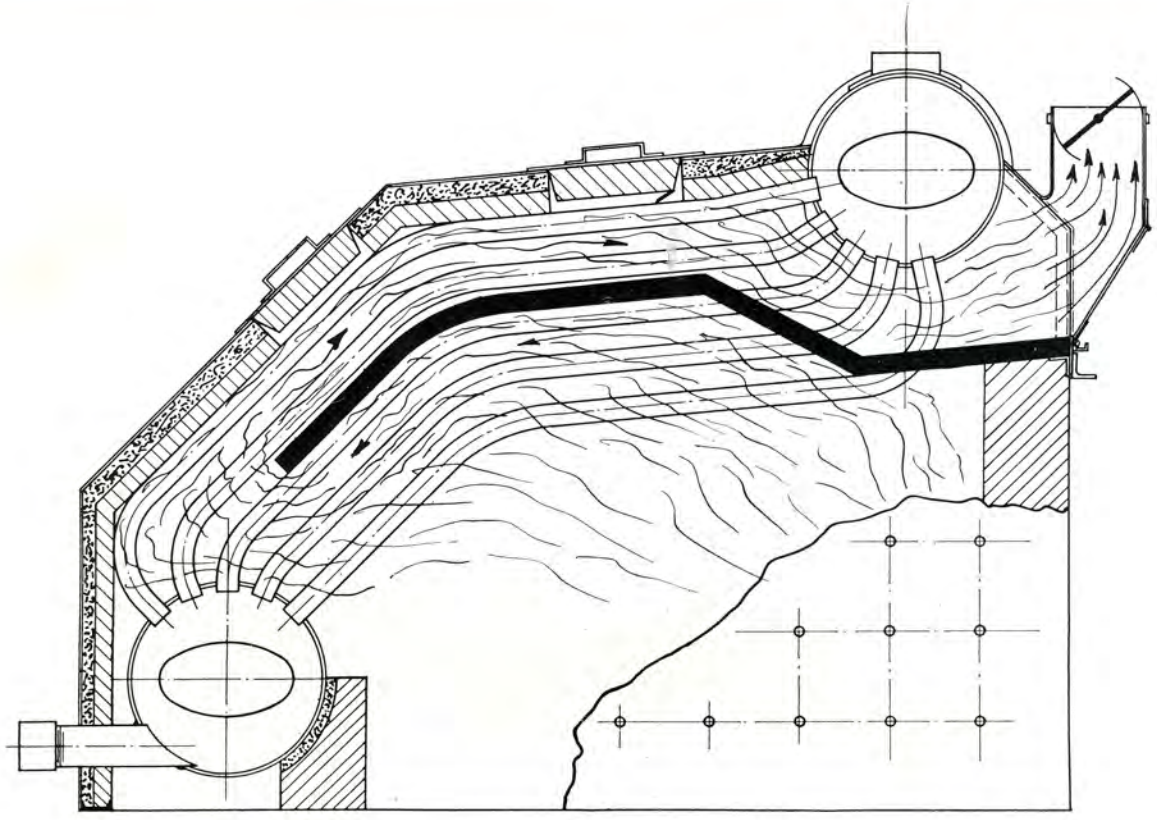
The manheads for access to the interior of the boiler may be placed on either right or left hand side of the boiler. Style of baffling and location of manheads are furnished at option of the customer, at no change in price.

A complete steel front with fire and ash doors is provided.

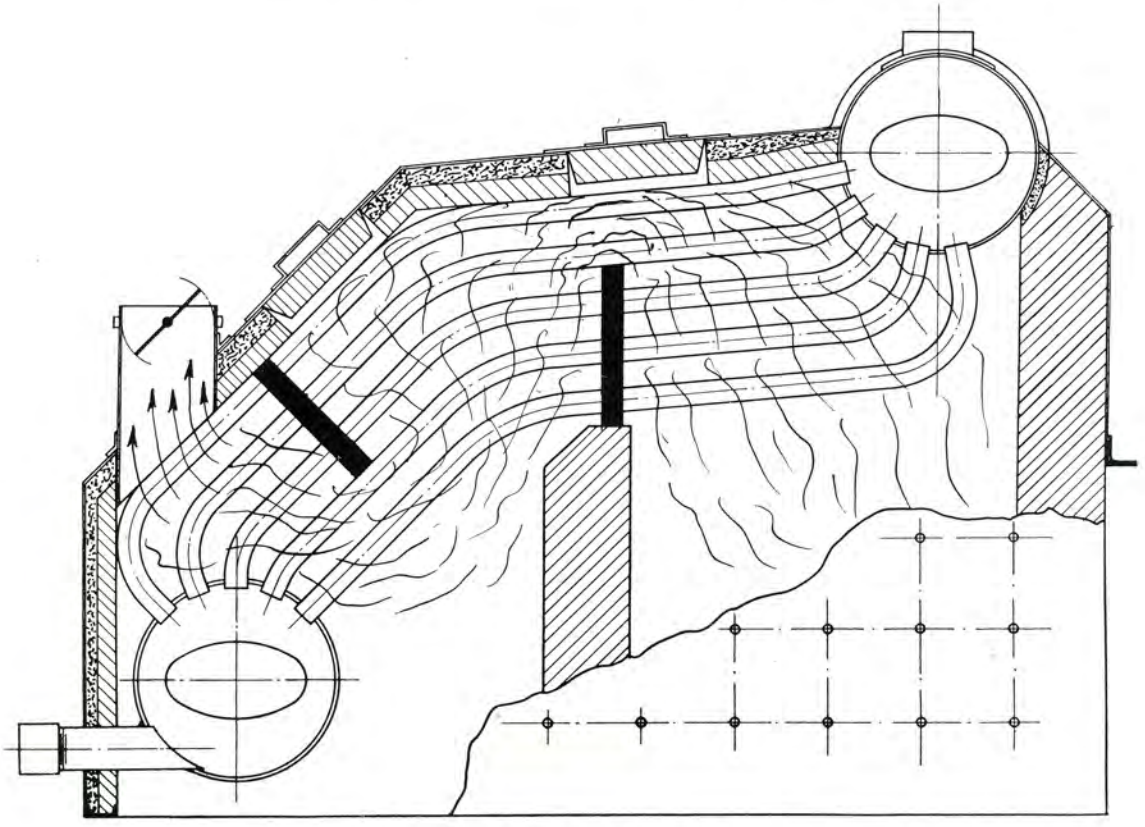
When hand fired, Murray water tube heating boilers are provided with extra heavy pattern rocking grates. If stoker, oil or gas fired, the lower section of front is provided with openings for the reception of stoker drive and wind box or gas or oil burner.

A complete set of steam trimmings is furnished with all boilers, consisting of water column, water column piping, water gauge, gauge cocks, steam gauge and syphon and pop safety valves. When hand fired, a damper regulator is furnished.

Murray water tube heating boilers are compact in design, the low head room required and the low water line allow maximum capacity to be installed in minimum space.



Boiler baffled for smoke outlet at front.



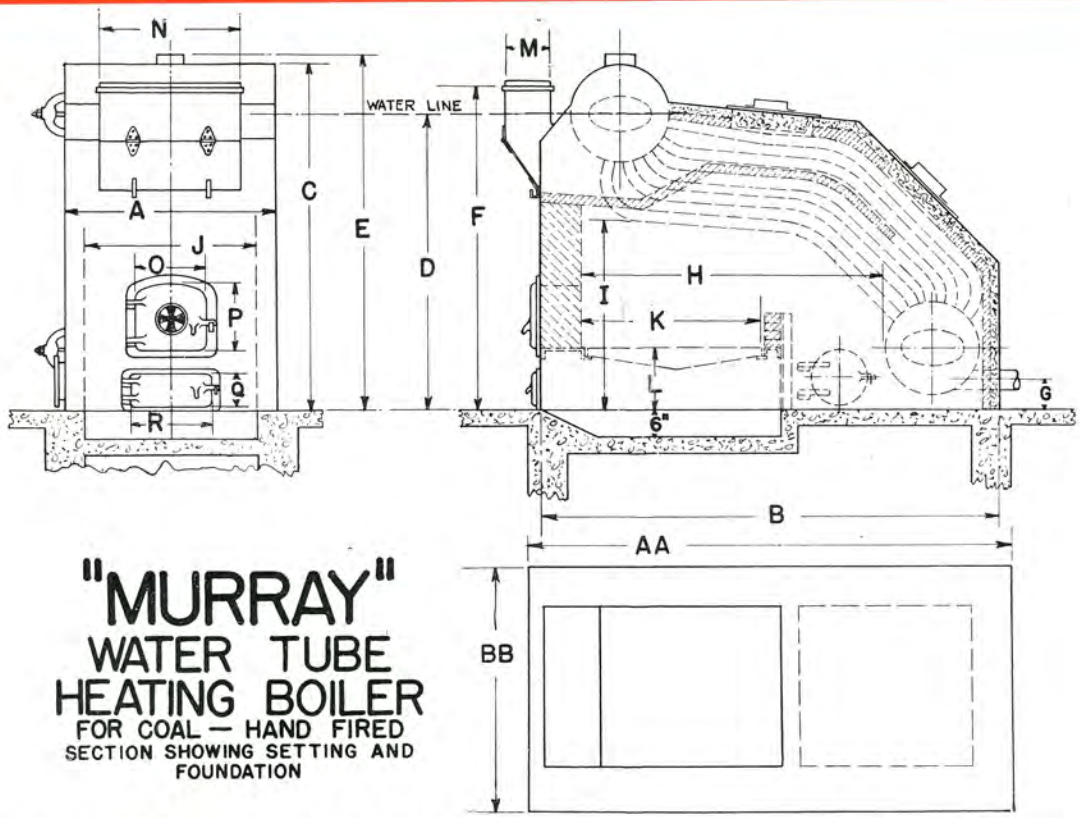
Boiler baffled for smoke outlet at rear.

MURRAY WATER TUBE
HEATING BOILER

SPECIFICATIONS AND DATA
FOR COAL HAND-FIRED

BOILER NUMBER — Style	E	E	E	E	E	F	F	F	F	F	F	F	G	G	G	G	G	G	G	G
BOILER NUMBER — Number	5-6	5-7	5-8	5-9	5-10	7-6	7-7	7-8	7-9	7-10	7-11	7-12	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
RATING-STEAM RADIATION Sq.Ft.	2860	3220	3580	3950	4310	4800	5460	6120	6780	7430	8110	8750	9580	10460	11340	12240	13130	14010	14910	15790
-WATER RADIATION Sq.Ft.	4580	5150	5730	6320	6900	7680	8740	9790	10850	11890	12980	14000	15330	16740	18140	19580	21010	22420	23860	25260
-B.T.U. PER HOUR 1000's	686	773	859	948	1034	1152	1310	1469	1627	1783	1946	2100	2299	2510	2722	2938	3151	3362	3578	3790
HEATING SURFACE Sq.Ft.	204	230	256	282	308	343	390	437	484	531	579	625	684	747	810	874	938	1001	1065	1128
GRATE AREA Sq.Ft.	8.8	9.8	11.4	12.4	14.0	11.3	12.5	14.6	15.9	18.0	19.3	21.6	17.7	20.0	21.6	23.8	25.2	27.5	29.0	31.3
WIDTH OF BOILER In.	39	43	48	52	57	39	43	48	52	57	61	66	52	57	61	66	70	75	79	84
LENGTH OF BOILER Ft.In.	8-9	8-9	8-9	8-9	8-9	11-9	11-9	11-9	11-9	11-9	11-9	11-9	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
BOILER HEIGHT-FLOOR TO TOP In.	83	83	83	83	83	95	95	95	95	95	95	95	105	105	105	105	105	105	105	105
HEIGHT OF WATER LINE In.	68	68	68	68	68	77	77	77	77	77	77	77	87	87	87	87	87	87	87	87
SHIPPING WEIGHT Lbs.	7500	8100	8600	9200	9800	10500	11000	11800	12400	13000	13600	14200	15000	16100	17400	18700	20000	21300	22600	24000
DIAMETER UPPER DRUM In.	20	20	20	20	20	24	24	24	24	24	24	24	27	27	27	27	27	27	27	27
DIAMETER LOWER DRUM In.	20	20	20	20	20	24	24	24	24	24	24	24	27	27	27	27	27	27	27	27
LENGTH OF FIREBOX In.	69	69	69	69	69	90	90	90	90	90	90	90	125	125	125	125	125	125	125	125
WIDTH OF FIREBOX In.	30	33½	39	42½	48	30	33½	39	42½	48	51½	57	42½	48	51½	57	60½	66	69½	75
HEIGHT OF FIREBOX In.	44	44	44	44	44	46	46	46	46	46	46	46	51	51	51	51	51	51	51	51
STEAM SUPPLY SIZE In.	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8
RETURN INLET SIZE In.	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
SAFETY VALVE SIZE In.	2	2	2	2	2½	2½	2½	2½	2½	2½	3	3	2-2	2-2	2-2	2-2	2-2½	2-2½	2-2½	2-2½
BREECHING DIA.- 1 BOILER In.	20	22	22	22	22	22	22	24	24	24	26	26	28	28	30	30	32	32	34	34
STACK DIAMETER- 1 " In.	18	20	20	20	20	20	20	22	22	22	24	24	26	26	28	28	30	30	32	32
MIN. STACK HEIGHT-1 " Ft.	45	45	45	50	55	55	55	55	55	55	60	60	65	65	65	65	70	70	70	70
BREECHING DIA.- 2 BOILERS In.	26	28	28	30	30	30	30	32	32	32	36	36	38	38	42	42	44	44	48	48
STACK DIAMETER- 2 " In.	24	26	26	28	28	28	28	30	30	30	34	34	36	36	40	40	42	42	46	46
MIN. STACK HEIGHT-2 " Ft.	55	55	55	60	65	65	65	65	65	70	70	70	75	75	75	75	80	80	80	80
SIDE SURFACE TO COVER Sq.Ft.	95	95	95	95	95	145	145	145	145	145	145	145	200	200	200	200	200	200	200	200

MURRAY WATER TUBE HEATING BOILERS CONFORM TO THE A.S.M.E. BOILER CONSTRUCTION CODE FOR 15 LBS., AND FOR RATING WITH THE S.H.B.I. SIMPLIFIED PRACTICE.



"MURRAY"
WATER TUBE HEATING BOILER
FOR COAL — HAND FIRED
SECTION SHOWING SETTING AND FOUNDATION

SETTING AND BOILER MEASUREMENTS — FOR COAL HAND FIRED

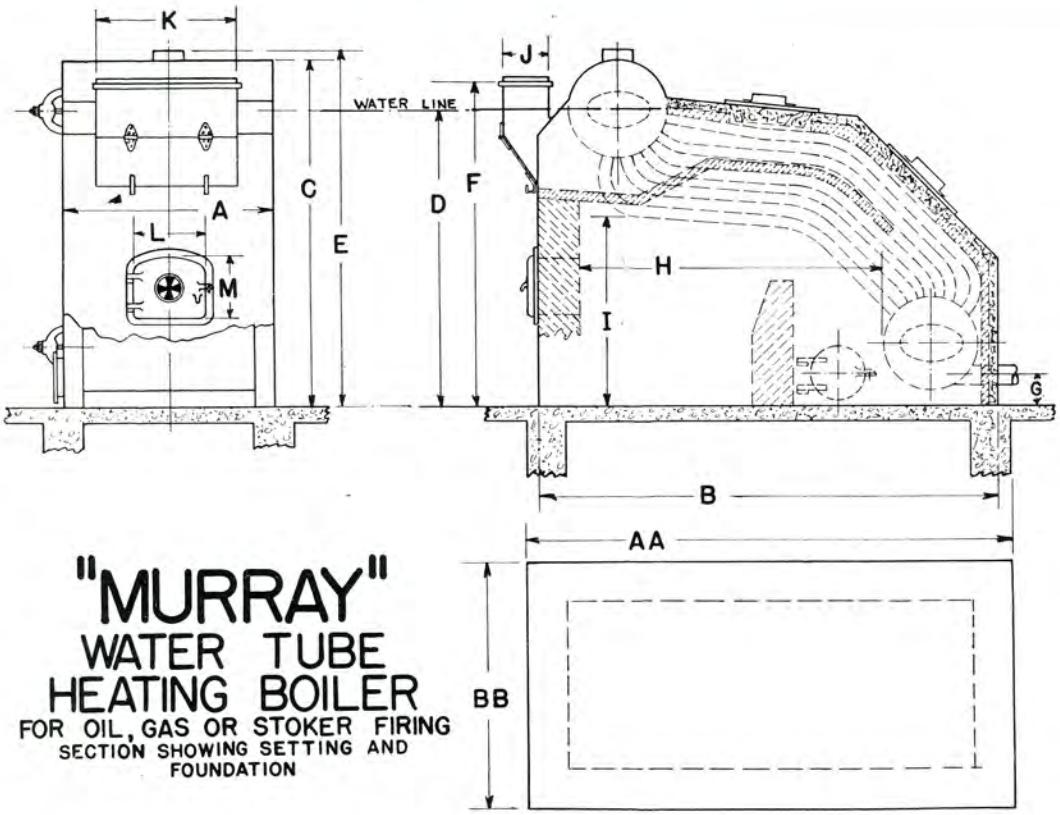
BOILER NUMBER	Style	E	E	E	E	E	F	F	F	F	F	F	F	G	G	G	G	G	G	G	G
	Number	5-6	5-7	5-8	5-9	5-10	7-6	7-7	7-8	7-9	7-10	7-11	7-12	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
A-BOILER WIDTH	In.	39	43	48	52	57	39	43	48	52	57	61	66	52	57	61	66	70	75	79	84
B-BOILER LENGTH	Ft.In.	8-9	8-9	8-9	8-9	8-9	11-9	11-9	11-9	11-9	11-9	11-9	11-9	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
C-BOILER HEIGHT	In.	83	83	83	83	83	95	95	95	95	95	95	95	105	105	105	105	105	105	105	105
D-WATER LINE HEIGHT	In.	68	68	68	68	68	77	77	77	77	77	77	77	87	87	87	87	87	87	87	87
E-STEAM SUPPLY HEIGHT	In.	81	81	81	81	81	92	92	92	92	92	92	92	103	103	103	103	103	103	103	103
F-SMOKE OUTLET HEIGHT	In.	74	74	74	74	74	83	83	83	83	83	83	83	93	93	93	93	93	93	93	93
G-RETURN HEIGHT C/L.	In.	7	7	7	7	7	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½
H-LENGTH OF FIREBOX	Ft.In.	5-9	5-9	5-9	5-9	5-9	7-6	7-6	7-6	7-6	7-6	7-6	7-6	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
I-FIREBOX HEIGHT	In.	44	44	44	44	44	46	46	46	46	46	46	46	51	51	51	51	51	51	51	51
J-GRATE WIDTH	In.	30	33½	39	42½	48	30	33½	39	42½	48	51½	57	42½	48	51½	57	60½	66	69½	75
K-GRATE LENGTH	In.	42	42	42	42	42	54	54	54	54	54	54	54	60	60	60	60	60	60	60	60
L-GRATE ABOVE FLOOR	In.	14	14	14	14	14	15	15	15	15	15	15	15	16	16	16	16	16	16	16	16
M-SMOKE OUTLET WIDTH	In.	10	10	10	10	10	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14
N-SMOKE OUTLET LENGTH	In.	26	30	32	34	40	28	30	36	38	42	48	54	38	42	48	54	57	62	66	69
O-WIDTH OF FIRE DOOR	In.	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
P-HEIGHT OF FIRE DOOR	In.	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
NUMBER OF FIRE DOORS		1	1	1	1	2	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2
Q-WIDTH OF ASH PIT DOOR	In.	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
R-HEIGHT OF ASH PIT DOOR	In.	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½
NUMBER OF ASH PIT DOORS		1	1	1	1	2	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2
AA-FOUNDATION LENGTH	Ft.In.	9-2	9-2	9-2	9-2	9-2	12-2	12-2	12-2	12-2	12-2	12-2	12-2	14-5	14-5	14-5	14-5	14-5	14-5	14-5	14-5
BB-FOUNDATION WIDTH	Ft.In.	4-0	4-4	4-9	5-1	5-6	4-0	4-4	4-9	5-1	5-6	5-10	6-3	5-1	5-6	5-10	6-3	6-7	7-0	7-4	7-9
CC-LENGTH OF ASH PIT	Ft.In.	3-6	3-6	3-6	3-6	3-6	4-6	4-6	4-6	4-6	4-6	4-6	4-6	5-0	5-0	5-0	5-0	5-0	5-0	5-0	5-0

MURRAY WATER TUBE
HEATING BOILER

SPECIFICATIONS AND DATA
FOR OIL, GAS OR STOKER

	Style	EE	EE	EE	EE	EE	FF	FF	FF	FF	FF	FF	FF	GG	GG	GG	GG	GG	GG	GG	GG
BOILER NUMBER	Number	5-6	5-7	5-8	5-9	5-10	7-6	7-7	7-8	7-9	7-10	7-11	7-12	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
RATING-STEAM RADIATION	Sq.Ft.	3470	3910	4350	4790	5240	5830	6630	7430	8230	9030	9840	10630	11630	12700	13770	14860	15950	17020	18100	19180
-WATER RADIATION	Sq.Ft.	5550	6260	6960	7660	8380	9330	10610	11890	13170	14450	15740	17010	18610	20320	22030	23780	25520	27230	28960	30690
-B.T.U. PER HOUR	1000's	833	938	1044	1150	1258	1399	1591	1783	1975	2167	2362	2551	2791	3048	3305	3566	3828	4085	4344	4603
HEATING SURFACE	Sq.Ft.	204	230	256	282	308	343	390	437	484	531	579	625	684	747	810	874	938	1001	1065	1128
FURNACE VOLUME	Cu.Ft.	45	50	58	64	72	64	71	83	90	102	109	121	130	147	158	175	185	202	212	230
WIDTH OF BOILER	In.	39	43	48	52	57	39	43	48	52	57	61	66	52	57	61	66	70	75	79	84
LENGTH OF BOILER	Ft.In.	8-9	8-9	8-9	8-9	8-9	11-9	11-9	11-9	11-9	11-9	11-9	11-9	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
BOILER HEIGHT-FLOOR TO TOP	In.	83	83	83	83	83	95	95	95	95	95	95	95	105	105	105	105	105	105	105	105
HEIGHT OF WATER LINE	In.	68	68	68	68	68	77	77	77	77	77	77	77	87	87	87	87	87	87	87	87
SHIPPING WEIGHT	Lbs.	6800	7300	7800	8200	8700	9700	10200	11000	11500	12000	12400	12800	14000	15100	16300	17500	18600	19800	20900	22200
DIAMETER UPPER DRUM	In.	20	20	20	20	20	24	24	24	24	24	24	24	27	27	27	27	27	27	27	27
DIAMETER LOWER DRUM	In.	20	20	20	20	20	24	24	24	24	24	24	24	27	27	27	27	27	27	27	27
LENGTH OF FIREBOX	In.	69	69	69	69	69	90	90	90	90	90	90	90	125	125	125	125	125	125	125	125
WIDTH OF FIREBOX	In.	30	33½	39	42½	48	30	33½	39	42½	48	51½	57	42½	48	51½	57	60½	66	69½	75
HEIGHT OF FIREBOX	In.	44	44	44	44	44	46	46	46	46	46	46	46	51	51	51	51	51	51	51	51
STEAM SUPPLY SIZE	In.	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8
RETURN INLET SIZE	In.	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
SAFETY VALVE SIZE	In.	2	2	2	2	2½	2½	2½	2½	2½	2½	3	3	2-2	2-2	2-2	2-2	2-2½	2-2½	2-2½	2-2½
BREECHING DIA.- 1 BOILER	In.	20	22	22	22	22	22	22	24	24	24	26	26	28	28	30	30	32	32	34	34
STACK DIAMETER- 1 "	In.	18	20	20	20	20	20	20	22	22	22	24	24	26	26	28	28	30	30	32	32
MIN. STACK HEIGHT-1 "	Ft.	45	45	45	50	55	55	55	55	55	55	60	60	65	65	65	65	70	70	70	70
BREECHING DIA.- 2 BOILERS	In.	26	28	28	30	30	30	30	32	32	32	36	36	38	38	42	42	44	44	48	48
STACK DIAMETER- 2 "	In.	24	26	26	28	28	28	28	30	30	30	34	34	36	36	40	40	42	42	46	46
MIN. STACK HEIGHT-2 "	Ft.	55	55	55	60	65	65	65	65	65	70	70	70	75	75	75	75	80	80	80	80
SIDE SURFACE TO COVER	Sq.Ft.	95	95	95	95	95	145	145	145	145	145	145	145	200	200	200	200	200	200	200	200

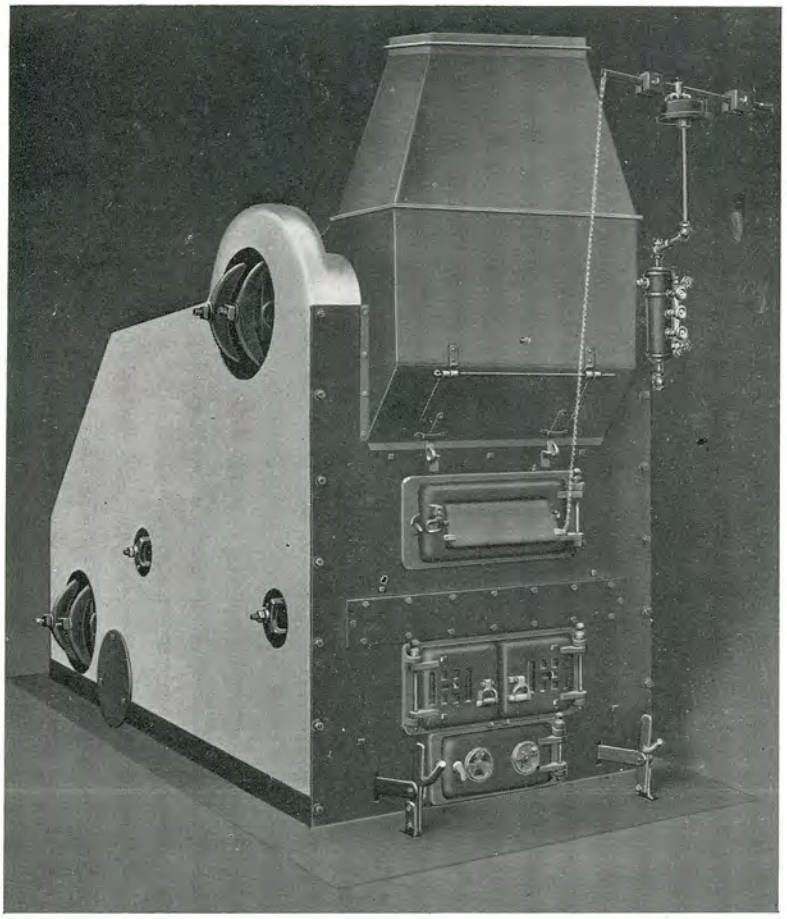
MURRAY WATER TUBE HEATING BOILERS CONFORM TO THE A.S.M.E. BOILER CONSTRUCTION CODE FOR 15 LBS., AND FOR RATING WITH THE S.H.B.I. SIMPLIFIED PRACTICE.



"MURRAY"
WATER TUBE HEATING BOILER
FOR OIL, GAS OR STOKER FIRING
SECTION SHOWING SETTING AND FOUNDATION

SETTING AND BOILER MEASUREMENTS — FOR OIL, GAS OR STOKER

BOILER NUMBER	Style	EE	EE	EE	EE	EE	FF	FF	FF	FF	FF	FF	FF	GG	GG	GG	GG	GG	GG	GG	GG
	Number	5-6	5-7	5-8	5-9	5-10	7-6	7-7	7-8	7-9	7-10	7-11	7-12	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
TUBE HEIGHT ABOVE FLOOR	In.	44	44	44	44	44	46	46	46	46	46	46	46	51	51	51	51	51	51	51	51
FIREBOX VOLUME	Cu.Ft.	45	50	58	64	72	64	71	83	90	102	109	121	130	147	158	175	185	202	212	230
A-BOILER WIDTH	In.	39	43	48	52	57	39	43	48	52	57	61	66	52	57	61	66	70	75	79	84
B-BOILER LENGTH	Ft.In.	8-9	8-9	8-9	8-9	8-9	11-9	11-9	11-9	11-9	11-9	11-9	11-9	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
C-BOILER HEIGHT	In.	83	83	83	83	83	95	95	95	95	95	95	95	105	105	105	105	105	105	105	105
D-WATER LINE HEIGHT	In.	68	68	68	68	68	77	77	77	77	77	77	77	87	87	87	87	87	87	87	87
E-STEAM SUPPLY HEIGHT	In.	81	81	81	81	81	92	92	92	92	92	92	92	103	103	103	103	103	103	103	103
F-SMOKE OUTLET HEIGHT	In.	74	74	74	74	74	83	83	83	83	83	83	83	93	93	93	93	93	93	93	93
G-RETURN HEIGHT C/L.	In.	7	7	7	7	7	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½
H-LENGTH OF FIREBOX	Ft.In.	5-9	5-9	5-9	5-9	5-9	7-6	7-6	7-6	7-6	7-6	7-6	7-6	10-5	10-5	10-5	10-5	10-5	10-5	10-5	10-5
I-FIREBOX HEIGHT	In.	44	44	44	44	44	46	46	46	46	46	46	46	51	51	51	51	51	51	51	51
J-SMOKE OUTLET WIDTH	In.	10	10	10	10	10	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14
K-SMOKE OUTLET LENGTH	In.	26	30	32	34	40	28	30	36	38	42	48	54	38	42	48	54	57	62	66	69
L-WIDTH OF FIRE DOOR	In.	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
M-HEIGHT OF FIRE DOOR	In.	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
NUMBER OF FIRE DOORS		1	1	1	1	2	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2
AA-FOUNDATION LENGTH	Ft.In.	9-2	9-2	9-2	9-2	9-2	12-2	12-2	12-2	12-2	12-2	12-2	12-2	14-5	14-5	14-5	14-5	14-5	14-5	14-5	14-5
BB-FOUNDATION WIDTH	Ft.In.	4-0	4-4	4-9	5-1	5-6	4-0	4-4	4-9	5-1	5-6	5-10	6-3	5-1	5-6	5-10	6-3	6-7	7-0	7-4	7-9



Two Drum Murray Heating Boiler

Built with Down Draft Furnace
for smokeless operation
with hand firing

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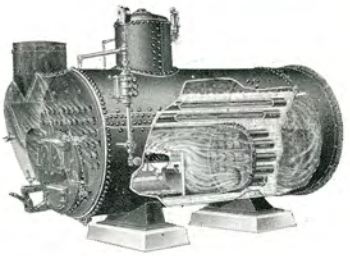
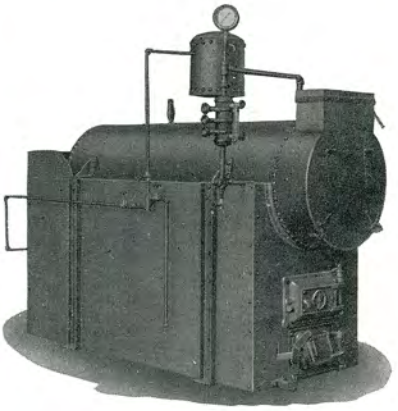
Murray Iron Works Company

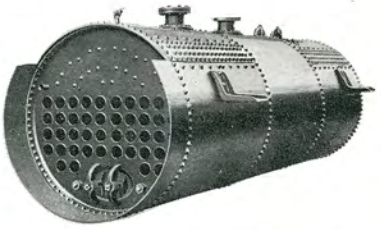
BURLINGTON, IOWA



Duplex Boiler

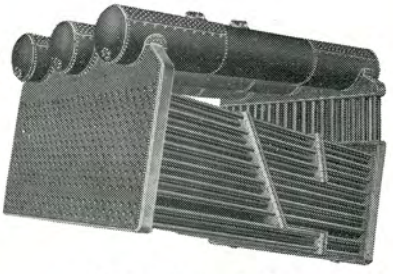


Lowcost Boiler



Horizontal Tubular Boiler

Cross Drum Boiler



Water Tube Boiler

5-2-38. 3m